

APPARATUS AND METHOD FOR ANALYZING AN ELECTRO-ACOUSTIC SYSTEM

ABSTRACT OF THE DISCLOSURE

An analysis system for accurately measuring the time-of-flight of an audio signal generated in response to a stimulus signal by an electro-acoustic transducer of an electro-acoustic system, such as an audio loudspeaker, to a point of measurement. The measurement is made by correlating the audio signal to a second signal having the same characteristics as the stimulus signal, but is delayed with respect to the stimulus signal. The measurement identifies the total overall delay from the time the stimulus signal is generated to the time the resulting audio signal is detected. Thus, any system delays, such as those due to signal processing, have already been accounted for by the measurement. Some or all of the measurement process may be automated through software programming in order to minimize measurement time. The time-of-flight is the delay time corresponding to when the stimulus signal, or the delayed second signal, and the resulting audio signal reach peak correlation. The distance of the acoustic center of the transducer can be calculated from the measured time-of-flight. The resulting comparison between the audio signal and the delayed second signal may also be used to determine the polarity of the transducer with respect to the stimulus signal.